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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/652,449	08/29/2003	Minas H. Tanielian	BO1 - 0257US	2457
60483	7590	10/15/2007		
LEE & HAYES, PLLC 421 W. RIVERSIDE AVE. SUITE 500 SPOKANE, WA 99201			EXAMINER TAMAI, KARL I	
			ART UNIT 2834	PAPER NUMBER
			MAIL DATE 10/15/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/652,449

Applicant(s)

TANIELIAN, MINAS H.

Examiner

Tamai I.E. Karl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 29-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. This application contains claims 29-50 drawn to an invention nonelected with traverse in the reply filed on 1/16/2007. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Specification

2. The amended title, APPARATUS AND METHODS FOR CONVERTING THERMAL ENERGY INTO AN ELECTRIC CURRENT, of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The examiner suggests "Thermotunnel Generator having Nanometer spaced Mated Electrodes".

Drawings

3. The objection to the drawings is withdrawn.

Claim Objections

4. The objection to Claims 14-28 is withdrawn.

5. Claims 14-28 are objected to as being vague and indefinite. The claim recites rearranging polycrystalline structure when an initial polycrystalline structure is not claimed.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 7, 8, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Huffman (US 3169200). Huffman teaches a thermo tunnel having first and second electrodes separated by a gap of (1 angstrom/1nm)(col. 5, line 2). In regards to the method of making limitations in claims 1, 7, 8, and 13, the method of making are not germane to the patentability of the apparatus.

8. Claims 1, 7, 8, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Tavkhelidze et al. (Tavkhelidze) (US 6720704). Tavkhelidze teaches a thermo tunnel having first and second electrodes separated by a gap of (10 angstrom/1nm) (claims 22). In regards to the method of making the gap limitations in claims 1, 7, 8, and 13 are not germane to the patentability of the apparatus.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2-4 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tavkhelidze et al. (Tavkhelidze) (US 6720704) in further view of Martinovsky et al. (Martinovsky)(US 6876123). Tavkhelidze teaches every aspect of the invention except the electrode material being a base metal (Au, Pt, Pd, Ag, Si, W, or Cr) with an alkali metal (Cs or CsO) deposited on the surface. Martinovsky teaches the electrodes with gold or platinum combined with cesium forming an intermetallic compound having a low work function for thermo tunnels. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the thermotunnel of Tavkhelidze with electrodes having cesium on the surface of gold because Martinovsky teaches it provides an efficient generator with low work function electrodes.

11. Claims 5, 6, 9, 14, 18-24, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tavkhelidze et al. (Tavkhelidze) (US 6720704) in further view of Caldwell (US 3515908). Tavkhelidze suggest the use of MEMS techniques and glass or silicon or silica (silicon dioxide) substrates for the generator and electrodes. Tavkhelidze teaches every aspect of the invention except electrodes formed on wafers or substrates that are bonded together and a plurality of tunneling units with removed

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substrate material. Caldwell teaches the electrodes in a thermo electric device on two substrates bonded together (3, 13) with recesses 31 in the removed between two generating electrodes which are connected in series. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the thermotunnel of Tavkhelidze with electrodes formed on bonded substrates as in Caldwell to utilize MEMS assembly techniques as suggested by Tavkhelidze.

In regards to the method of making the gap limitations in claims 18, 19, and 28 are not germane to the patentability of the apparatus. The examiner notes that the recesses or wells 21 between the thermoelectric units in Caldwell are not taught as being etched but the limitation is a method of making limitation, which is not germane to the patentability of the apparatus, and Tavkhelidze suggests etching because it suggests MEMS manufacturing techniques.

12. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tavkhelidze et al. (Tavkhelidze) (US 6720704) in further view of Yater (US 4004210). Tavkhelidze teaches every aspect of the invention except metal plating next to the electrodes and a conductive material adjacent the plating. Yater teaches metal plating 33 to minimize heat loss from the generator and metal plates 10 next to the metal plates forming another generator. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the thermotunnel of Tavkhelidze with metal plates to minimize heat loss and with an adjacent metal material of another generator to increase the electrical output through multiple generators, as taught by Yater.

13. Claims 15-17 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tavkhelidze et al. (Tavkhelidze) (US 6720704) and Caldwell (US 3515908), in further view of Martinovsky et al. (Martinovsky)(US 6876123). Tavkhelidze and Caldwell teach every aspect of the invention except the electrode material being a base metal (Au, Pt, Pd, Ag, Si, W, or Cr) with an alkali metal (Cs or CsO) deposited on the surface. Martinovsky teaches the electrodes with gold or platinum combined with cesium form an intermetallic compound having a low work function for thermo tunnels. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the thermotunnel of Tavkhelidze and Caldwell with electrodes having cesium on the surface of gold because Martinovsky teaches it provides an efficient generator with low work function electrodes.

14. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tavkhelidze et al. (Tavkhelidze) (US 6720704) and Caldwell (US 3515908), in further view of Yater (US 4004210). Tavkhelidze and Caldwell teach every aspect of the invention except metal plating next to the electrodes and a conductive material adjacent the plating. Yater teaches metal plating 33 to minimize heat loss from the generator and metal plates 10 next to the metal plates forming another generator. It would have been obvious to a person of ordinary skill in the art at the time of the invention to construct the thermotunnel of Tavkhelidze and Caldwell with metal plates to minimize heat loss and with an adjacent metal material of another generator to increase the electrical output through multiple generators, as taught by Yater.

Response to Arguments

15. Applicant's arguments filed 8/2/2007 have been fully considered but they are not persuasive. As a product by a process claim "even though the product-by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of the product does not depend on its method of production. If the product in the product by process claim is the same or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process". *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966(Fed. Cir. 1985). Therefore, whether the electrodes are formed by deposition, etching, by the application of a current/voltage, the nanometer spacing of the electrodes are structurally the same and the material of the electrode is still the same, therefore the rejection is proper and maintained.

Conclusion

16. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karl I.E. Tamai whose telephone number is (571) 272 - 2036.

The examiner can be normally contacted on Monday through Friday from 8:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Darren Schuberg, can be reached at (571) 272 - 2044. The facsimile number for the Group is (571) 273 - 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Karl I Tamai
PRIMARY PATENT EXAMINER
October 11, 2007



KARL TAMAI
PRIMARY EXAMINER